PERMIT TO CONSTRUCT EVALUATION
(ALTN/MODIFN)

APPLICANT'S NAME: ORANGE COUNTY SANITATION DISTRICT (OCSD)

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FOUNTAIN VALLEY, CA 92728
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EQUIPMENT ADDRESS: 10844 ELLIS AVENUE (PLANT NO. 1)
FOUNTAIN VALLEY, CA 92718-7018

FACILITY ID NO.: **017301**

EQUIPMENT DESCRIPTION:

MODIFICATION OF THE EXISTING ODOR CONTROL SYSTEM, F94280, CONSISTING OF;

1. FOUL AIR DUCTING FROM WET WELL AND ASSOCIATED TRUNK LINES (ELLIS PUMP STATION, OCSD PLANT NO. 1).

2. TWO BLOWERS, IN PARALLEL, EACH 7500 SCFM FLOW RATE

3. TWO ADSORBERS, IN PARALLEL, CONTAINING US FILTER/WESTATES MIDAS OCM OR CALGON CARBON MINOTAUR, EACH WITH A MINIMUM OF 8000 LBS OF HIGH H2S CAPACITY ACTIVATED CARBON.

4. TWO EXHAUST STACKS, EACH 2' - 6" DIA. X 6.5' H. WITH RAIN CAP.

BY REPLACEMENT WITH NEW ADSORBENT MEDIA BLEND, EXHAUST STACK, AND REMOVAL OF A RAIN CAP, AS FOLLOWS,

1. FOUL AIR DUCTING FROM WET WELL AND ASSOCIATED TRUNK LINES (STEVE ANDERSON LIFT STATION, OCSD PLANT NO. 1).

2. TWO BLOWERS, IN PARALLEL, EACH 7500 SCFM FLOW RATE

3. TWO ADSORBERS, IN PARALLEL, CONTAINING PUREAIR FILTRATION OR EQUAL ADSORBENT MEDIA, A BLEND OF POTASSIUM PERMANGANATE BASED AND GRANULAR ACTIVATED CARBON MEDIA, EACH ADSORBER WITH A MINIMUM OF 382 CUBIC FEET OF HIGH H2S CAPACITY MEDIA BLEND.

4. HYDROGEN SULFIDE CONTINUOUS EMISSION MONITORING AND INTEGRATED SAMPLING SYSTEM.

5. TWO EXHAUST STACKS, EACH 2' - 0" DIA. X 25' – 6”H.

PERMIT CONDITIONS:

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATIONS UNDER WHICH THIS PERMIT IS ISSUED.
   [RULE 204]

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITIONS AT ALL TIMES.
   [RULE 204]

3. THIS PERMIT SHALL EXPIRE IF CONSTRUCTION OF THE EQUIPMENT IS NOT COMPLETED WITHIN ONE YEAR FROM THE DATE OF ISSUANCE OF THIS PERMIT UNLESS AN EXTENSION IS GRANTED BY THE EXECUTIVE OFFICER.
   [RULE 205]

4. IDENTIFICATION TAG (S) OR NAMEPLATE (S) SHALL BE DISPLAYED ON THE EQUIPMENT TO SHOW MANUFACTURER MODEL NO. AND SERIAL NO. THE TAG (S) OR PLATE (S) SHALL BE ISSUED BY THE MANUFACTURER AND SHALL BE AFFIXED TO THE EQUIPMENT IN A PERMANENT AND CONSPICUOUS POSITION.
   [RULE 204]

5. A FLOW METER SHALL BE INSTALLED AND MAINTAINED AT THE INLET STREAM TO EACH CARBON ADSORBER TO INDICATE THE FOUL AIR TREATED, IN CUBIC FEET PER MINUTE (CFM). IN CASE A PRESSURE SENSOR DEVICE IS USED IN PLACE OF THE FLOW METER, A CONVERSION CHART SHALL BE MAINTAINED TO INDICATE THE CORRESPONDING FLOW RATE, IN CFM, TO THE PRESSURE READING.
   [RULE 204]

6. MAXIMUM FOUL AIR FLOW TO BE TREATED BY EACH OF THE CARBON ADSORBER SHALL NOT EXCEED 7500 CFM.
   [RULE 402]

7. FOR EACH CARBON ADSORBER, TOTAL ORGANIC COMPOUNDS (TOCs) CONCENTRATION (PPMV) SHALL BE MONITORED AT EACH EXHAUST STACK, AT LEAST ONCE EVERY 7 DAYS OF OPERATION, FOR THE FIRST SIX-MONTH AND THEN ON A MONTHLY BASIS, USING A PHOTO IONIZATION DETECTOR OR AN ORGANIC VAPOR ANALYZER. RECORDS SHALL BE MAINTAINED AND KEPT ON FILE.
   [RULE 204]

8. THE TOC CONCENTRATION MEASURED AT THE EXHAUST FROM EACH CARBON ADSORBER SHALL NOT EXCEED 2.2 PPMV, AS CARBON.
   [RULE 204]

9. WHEN IN OPERATION, H2S CONCENTRATION (PPMV) IN EACH EXHAUST STACK SHALL BE MONITORED AND RECORDED USING A HYDROGEN SULFIDE CONTINUOUS EMISSION MONITORING AND INTEGRATED SAMPLING SYSTEM (CEMS). WHEN THE H2S MONITORING SYSTEM IS SHUTDOWN FOR REPAIR OR MAINTENANCE, PORTABLE DEVICES SUCH AS JEROME OR COLORIMETRIC TUBES SHALL BE USED TO MEASURE AND RECORD OUTLET H2S AT LEAST ONCE PER SHIFT.

10. THE HYDROGEN SULFIDE (H2S) CONCENTRATION MEASURED AT EACH EXHAUST STACK, USING CEMS SHALL NOT EXCEED 2.45 PPMV, AVERAGED OVER ONE HOUR
[RULE 402, 1401]

11. IF THE HYDROGEN SULFIDE (H2S) CONCENTRATION MEASURED AT THE EXHAUST STACK IS DETECTED ABOVE 2.2 PPMV, THEN IMMEDIATE CORRECTIVE MEASURES SHALL BE TAKEN INCLUDING ACTIVATED CARBON REPLACEMENT, WITH FRESH CARBON, BEFORE RESUMING OPERATION.
[RULE 402, 1401]

12. SPENT CARBON REMOVED FROM THIS SYSTEM SHALL BE MAINTAINED OR STORED IN CLOSED CONTAINERS PRIOR TO REMOVAL FROM SITE.
[RULE 204]

13. IF THE OPERATION OF THIS EQUIPMENT RESULTS IN CONSIDERABLE NUMBER OF ODOR COMPLAINTS, THE WORK SHALL CEASE AND MITIGATION MEASURES SHALL BE IMPLEMENTED IMMEDIATELY. WORK SHALL NOT RESUME UNTIL EMISSIONS CAUSING THE COMPLAINTS IS MITIGATED.
[RULE 402]

14. RECORDS SHALL BE MAINTAINED AS REQUIRED BY THIS PERMIT INCLUDING CARBON CHANGE OVER DATE(S) FOR COMPLIANCE. THE RECORDS SHALL BE KEPT FOR AT LEAST FIVE YEARS AND MADE AVAILABLE TO AQMD PERSONNEL UPON REQUEST.
[RULE 204]

BACKGROUND:

The above application No. 504150 was submitted, for alteration/modification of the existing odor control permit F94280, A/N 459958 (Fountain Valley, Plant-1), as Class-I on 12/10/09. The odor control equipment modifications involve change in stack height and diameter, no rain cap and change in adsorbent media type. As per applicant, OCSD has recently experienced some odor problems in the vicinity of the equipment resulting in few odor complaints. Odor control unit treats foul-air from the Steven Anderson Lift Station.

This modification has been revised as a "Permit to Construct" per current permitting practice.

This is a Title V facility. On 12/15/2009, a TV Revision No. 2 (significant, A/N 499793) has been sent to EPA for their 45-day reviw and comments. OCSD has also submitted a new A/N 504320 for TV Revision (03) to include this odor control equipment's modifications.

This facility is considered a major hazardous air pollutant (HAP) source as facility's emissions data reported for 2008 TACs show 10.2 TPY Formaldehyde emission.

PROCESS DESCRIPTION:

The odor control system consists of two activated carbon adsorbers, operating in parallel, and designed to treat 7500 cfm of foul-air by each unit. Foul air source is from the raw sewage influent trunk line/Wet well station (Steve Anderson Lift Station), Plant 1. Foul-air flow rate is 15,000 cfm and will be split equally (7500 cfm) between two adsorbers by manually adjusting a damper. Under normal operation both adsorbers will be in service and treated air exhsuat from their respective exhaust stack (2 stacks). When media change over is required for one adsorber, the other adsorber remains in service. OCSD is proposing more effiocient blend of the adsorbents, consisting of virgin bituminous activated carbon

(Sulphasorb XL, Acid gas adsorbent with 41% -by wt.- H2S removal capacity) and PreAir 8 potassium permanganate based media (CPS blend adsorbent media). OCSD states that overall control efficiency is expected to be 99% for each TOC and H2S compounds. OCSD has requested to allow for operating flexibility by using different blend proportions for the media (this will result in different densities) and, hence, would like to have media for each adsorber as minimum of 382 cubic feet instead of lbs limit. Each adsorber is equipped with a differential pressure gauge to measure pressure drop across the inlet and outlet of the GAC unit. Odor control unit will be equipped with Hydrogen Sulfide Continuous Emission Monitor and Integrated Sampling System (The Sycamore CEM that offers various ranges for H2S measurement).

VOC (=TOC) & H_2S EMISSIONS:

OCSD has provided (email, Jan. 8, 2010) typical foul-air analytical data for VOC and H2S over a 3-month period, for minimum, maximum and average values, as follows;

Foul-Air	H2S, ppmv	VOC (TOC), ppmv
Min.	0.18	1.54
Max.	**48.0**	**22.2**
Avg.	15.6	8.8

VOC (TOC) inlet, foul-air = (15000 scfm) (22.2 ppmv) (12) (60) / 379 x 10^6
= **0.63 lbs/hr, as C (R1)**
= 15.12 lbs/day VOC (TOC), as C

Total H2S inlet, foul-air = (15000 scfm) (48.0 ppmv) (34) (60) / 379 x 10^6
= **3.87 lbs/hr (R1)**
= 92.9 lbs/day

Assumed 90% control efficiency (to allow for higher measurable VOC & H2S limit for monitoring, as requested by OCSD)

Controlled VOC (TOC) = (0.63 lbs/hr) (1.0 – 0.90) = **0.063 lbs/hr (R2)** = 1.51 lbs/day, as C

Controlled H2S = (3.87 lbs/hr) (1.0 – 0.90) = **0.387 lbs/hr (R2)** = 9.29 lbs/day

As foul-air is equally divided between two identical adsorbers,

VOC (TOC) for each adsorber, **Inlet** = 0.63 total / 2 = **0.315 lbs TOC /hr /adsorber**
H2S for each adsorber, **Inlet** = 3.87 toal / 2 = **1.935 lbs H2S /hr /adsorber**

$$\text{TOC (VOC),exhaust} = \frac{(0.315 \times 0.1) \text{ lbs/hr} / 12}{(7500 \text{ scfm} \times 60 \text{ min/hr} \times 0.0752 \text{ lbs/ft}^3)/29 \text{ lb./lb. mole.}}$$
= **2.2 ppmv, as C**

$$\text{H2S, exhaust} = \frac{(\sout{1.935} \times 0.1) \text{ lbs/hr} / 34}{(7500 \text{ scfm} \times 60 \text{ min/hr} \times 0.0752 \text{ lbs/ft}^3)/29 \text{ lb./lb. mole.}}$$
= **~~4.9 ppmv~~ H2S**

From the revised odor threshold analysis (Rule 402), revised H2S limit = **2.45 ppmv** (0.97 lbs H2S /hr/stack).
So, R2 = 0.97 lbs/hr /stck x 2 = 1.94 lbs/hr.

Carbon Breakthrough:

As per manufacturer's estimate expected media life is about 3 months (See OCSD email Jan 8, 2010).

MICR, HIC & HIA:

Please refer to Rule 1401 spreadsheet included in folder.
SCREEN 3 analysis was conducted and Tier 3 results (based on 7500 cfm/adsorber/exhaust stack) are summarized below,

MICR (Res) = 3.32E-07
Total MICR (Res) = 3.32E-07 x 2 stacks = 6.64 E-07.

MICR (Comm) = 5.78E-08
Total MICR (Comm) = 5.78E-08 x 2 stacks = 1.15.E-07.

Total HIC & HIA = <1 each, for aplicable target organs

RULES EVALUATION:

Rule 212: This is not a significant project. There are no schools within 1000' of emission source. MICR is less than one in a million. analysis. Estimated VOC emission 1.5 lb/day < R212 (g) emission threshold of 30 lbs/day. Compliance is expected.

Rule 401: The equipment is not expected to emit visible emissions with proper operation and maintenance.

Rule 402: With proper operation, monitoring and maintenance of the equipment no odor complaints are anticipated.

H2S ODOR CONTROL ANALYSIS:

SCREEN 3 model analysis indicated 1-hr maximum ground level con. @ 134 m = 57.04 mcg/m3 @ 1 lb/hr emission rate. This is based on worst-case scenario, i.e. maximum ground level con. occurs at 134 meter receptor.

Considering impact from 2-identical exhaust stack emissions into the atmosphere,
@ 0.1942 lbs H2S /hr x 57.04 mcg/m3 / 1 lb/hr x **2 stcks** = 22.16 mcg/m3
= 22.16 x 0.02445 / 34
= 0.0159 ppmv H2S
= **15.9 ppbv** < 30 ppbv H2S limit under CSAAQS.
BUT > 8 ppbv H2S odor threshold under OEHHA.
California State Ambient Air Quality Standard (CSAAQS)
California Office of Environmental Health Hazard Assessment Office (OEHHA).

Therefore, H2S emissions limit = 4.9 ppmv/ 2 = **2.45 ppmv** to keep < 8 ppbv H2S for OEHHA limit.
Compliance can be expected.

Reg. 13: Carbon adsorber is consias ered as a BACT for VOC and odor control (H_2S).
No modeling required for VOC
Offset required for VOC can be provided from priority reserve account as facility is an Essential Public Service.
Compliance is expected.

Rule 1401: SCREEN 3 and Tier 3 analysis indicated MICR < 1 in a million.
HIC and HIA are estimated to be < 1 for each applicable target organ.
Compliance is expected.

Rule 1401.1: Exempt. This is an existing facility.

Reg. XXX: This is a Title V facility. Compliance with this regulation is expected.

This facility is a major HAP source. EPA has addressed the need to list H2S as a HAP, but no formal listing action has been taken. Therefore, H2S is clearly an unlisted HAP.
(Ref: www.earthworksaction.org/publications.cfm?pubID=394)

Note: A joint resolution to remove H2S (a clerical error led to the inadvertent addition of H2S to the Section 112 (b) list of HAP. A joint resolution to remove H2S was approved by the President on December 4, 1991.(Ref. www.epa.gov/ttn/atw/pollutants/atwsmod.html)

TV revision A/N 504320 is submitted by OCSD.
Revised TV permit, with odor scrubber evaluation, will be submitted to EPA for 45-day review.

CONCLUSION / RECOMMENDATION:

Compliance with AQMD's applicable Rules and Regulations is expected.
Issue a P/C for the proposed modifications as listed on Pgs. 1 thru 3 and,
upon completion of EPA 45-day review/commenting period..